Chapter 18A
Foundations and Retaining Walls
Comparison Summary

The foundation design chapters, Chapter 18 (Soils and Foundations) in the *IBC* and Chapter 36 (Soils, Foundations, and Retaining Walls) of *NFPA 5000*, cover the design of foundations and earth-retaining structures.

IBC 2003

Chapter 18 of the *IBC* is 25 pages long. The chapter has been organized differently compared to the *CBC*, and includes greatly expanded coverage of foundation design. A useful feature of *CBC* Chapter 18 is the extensive cross-referencing provided, which directs the user to appropriate provisions in other chapters of the code. Seismic Design Category triggers many foundation design requirements. These triggers will require evaluation by OSHPD.

Coverage of deep foundation systems is much more extensive than in the *CBC.* The useful table of minimum foundation depth and thickness under light frame walls is retained. *IBC* provisions for unreinforced concrete and masonry basement walls will not be adopted for OSHPD's jurisdiction, and should be repealed for all other occupancies in California.

NFPA 5000

In *NFPA 5000*, soils, foundations, and retaining walls are covered in the 10 pages of Chapter 36. Chapter 36 contains provisions for a number of different types of foundation systems. A number of the provisions in Chapter 36 are vague. For example, Section 36.2.3.3 uses the phrase "safe side slopes, as determined by the AHJ", which seems to force the responsibility for determination of safe side slopes on to the building official. In Table 36.3.4(a), which gives permissible soil bearing values, the terms "soft", "medium", "hard", "compact", "loose" may be problematic for interpretation and use by typical users (non-geotechnical engineer) of these tables. In addition, there are no permissible bearing values for gravel and rock sites.

Many of the References in the Chapter 36 appear overbroad. For example, Section 36.1.1 states that foundations must meet ASCE7-02, Sections 9 and A9.7, over 100 pages of material (the entire Seismic Design Section). Section 36.9.1, retaining walls, stated that they shall be designed to resist design loads in Chapter 35, and to insure stability against overturning, sliding, excessive foundation pressure, and water uplift. Again reference is made to the entire Chapter. Further, the requirements are vague. What constitutes "excessive foundation pressure?" More precise language is needed. Another example is steel piles, covered in Section 36.5.7. Basically, this section requires that steel piles meet the requirements of Chapter 44, the steel chapter. Unfortunately, we could not locate any piling requirements in Chapter 44. Therefore,

the user would have to begin searching the referenced publications for the appropriate provision. In contrast, users of the *IBC* need only refer to Section 1809.3, which provides specific materials, allowable stress, and dimension information.

Summary

IBC Chapter 18 covers soils and foundations in a more comprehensive, precise, and enforceable manner than *NFPA 5000* Chapter 40. The overly broad references are especially troubling, as they force both the designer and building official to search through large volumes materials to find applicable provisions. This makes *NFPA 5000* significantly more difficult to use and enforce. In addition, provisions will need to be added to *NFPA 5000* to address frost protection, footings on or adjacent to slopes, footing widths for light frame construction, design for expansive soil, pier foundations, and permissible bearing values for gravel and rock sites.

Chapter 18A - Foundations and Retaining Walls

2001 CBC – Chapter 18A	IBC – Chapter 18	Comments
Division I - General **1801A – Scope** References App. Chapter 33A, UBC Std. 18-1 (soils classification), UBC Std. 18-2 (expansion index test)	**1801 - General**	Similar
1802A - Quality and Design Refers to App. Ch. 33	1801.2 Design	Similar
1803A - Soil Classification - Expansive Soil	1802.2.2 Expansive Soils	Similar; note that UBC Standards 18-1 and 18-2 discontinued
1804A - Foundation Investigation A.1 General. OSHPD amends re: required geotechnical investigation A.2 Investigation. OSHPD amends re: minimum # of borings, liquefaction analysis A.3 Reports. OSHPD amends re: liquefaction, high sulfate soils A.4 Expansive Soils. A.5 Liquefaction Potential. A.6 Adjacent Loads. A.7 Drainage.	**1802 – Foundation and Soils Investigations** 2.1 General 2.2 Where required (exception clause) 2.2.1 Questionable soil 2.2.2 Expansive soils 2.2.3 Ground-water table 2.2.4 Pile and pier foundation 2.2.5 Rock strata 2.2.6 SDC C 2.2.7 SDC D, E, F 2.3 Soil classification 2.4 Investigation 2.5 Soil boring and sampling 2.6 Reports 1803.3 Site grading (addresses A.7 provision pertaining to drainage around buildings)	Similar, continue OSHPD amendments; evaluate SDC "C" provisions for non-adoption
3301 – Excavations and Fills 1.1 General 1.2 Protection of adjoining property (see IBC 3307 for correlated provisions) *1.3 Protection of existing buildings* (OSHPD amendment, continue in 2004 CBC)	**1803 – Excavation, Grading and Fill** 3.1 Excavations near footings or foundations 3.2 Placement of backfill 3.3 Site grading 3.4 Grading and fill in floodways 3.5 Compacted fill material 3.6 Controlled low-strength material (CLSM)	Similar; continue OSHPD amendments to 3301
1805A - Allowable Foundation and Lateral Pressures Requires report based on bldg. Size, type of const. and loads	**1804 – Allowable Load-Bearing Values of Soils** 4.1 Design 4.2 Presumptive load-bearing values 4.3 Lateral sliding resistance Table 1804.2 Allowable Foundation and Lateral Pressure	Similar (no OSHPD amendments to this CBC section)

Chapter 18A - Foundations and Retaining Walls

2001 CBC – Chapter 18A	IBC – Chapter 18	Comments
1806A - Footings A.1 General. OSHPD amends re: unformed footing size	**1805 – Footings and Foundations** 5.1 General 1805.4.2.6 Forming of concrete	Similar, continue OSHPD amendments (amend 1805.4.2.6)
A.2 Footing Design. OSHPD amends re: elastic analysis. Model code provision refers to Div. III for slab/mat structure on expansive soils	5.4 Footings 1805.8 Design for expansive soils 1805.8.1 Foundations 1805.8.2 Slab-on-grade foundations 1805.8.3 Removal of expansive soil 1805.8.4 Stabilization	Similar, continue OSHPD amendment Evaluate 1805.8 for adoption/amendment
A.3 Bearing Walls. OSHPD amends to require shear wall footing to meet bearing wall footing requirements.	5.2 Depth of footings 5.4 Footings	Similar, continue OSHPD amendment
A.4 Stepped Foundations. OSHPD amends to limit step dimensions, detailing.	5.1 General	Continue OSHPD amendment
A.5 Footings on or Adjacent to Slopes. 1. scope 2. clearance from ascending slope 3. setback from descending slope 4. pools (setback from pool wall) 5. foundation elevation (drainage) 6. alternate setback and clearance	5.3 Footings on or adjacent to slopes 1. Building clearance from ascending slopes 2. Footing setback from descending slope surface 3. Pools 4. Foundation elevation 5. Alternate setback and clearance	Similar
A.6 Foundation Plates or Sills. 1. DSA amend. 2. sills at bearing and shear walls, OSHPD amends to ref. 2320A.6 3. Additional requirements for Seismic Zones 3 and 4 - 2x2x 3/16 plate washers	1805.6 Foundation plate or sill bolting (refers to Chapter 23, does not contain any other provisions)	CBC provision not continued in IBC Chapter 18, refer to 2308.6 Continue OSHPD amendment in 2308.6
A.7 Seismic Zone 3 and 4. Requires #4 cont. top and bottom at foundation.	1805.9 Seismic requirements Refers to Sec. 1910	IBC provisions differ from CBC due to SDC; also see Chapter 19 Evaluate for amendment; repeal exception 1. and 2.
A.8 Designs Employing Lateral Bearing. 1. general (OSHPD amends re: pile and caisson elastic deformation) 2. design criteria; non-constrained and constrained 3. backfill 4. limitations	1805.7 Designs employing lateral bearing 1. Limitation 2. Design criteria; non-constrained and constrained 3. Backfill 1812 - Pier Foundations (see below)	Similar IBC provisions contained in 1812 are new (see below)

Chapter 18A - Foundations and Retaining Walls

2001 CBC – Chapter 18A	IBC – Chapter 18	Comments
A.9 Gillage Footings.	1805.4.4 Steel grillage footings	Similar
A.10 Bleacher Footings	-	No provisions found; evaluate for amendment
A.11 Pipes and Trenches (OSHPD amendment re: trench setback, sleeved pipes)	-	Continue OSHPD amendment
-	1805.4.2.3 Plain concrete footings	Do not adopt
-	1805.4.2.4 Placement of concrete	Adopt
-	1805.4.2.5 Protection of concrete	Adopt
-	1805.4.3 Masonry-unit footings	Evaluate
-	1805.4.5 Timber footings	Do not adopt
-	1805.4.6 Wood foundations	Do not adopt
-	1805.5 Foundation walls includes sections 1805.5.1 through 1805.5.7 and Tables 1805.5 (1) through (4)	Do not adopt (these provisions are new to code and provide for non-engineered basement walls)
1611A.6 Retaining Walls	1806 – Retaining Walls	Continue amendments of 1611A.6 in 1806
-	1807 Dampproofing and Waterproofing	New provisions to model code – evaluate for adoption
1807A - Piles - General Requirements	**1808 – Pier and Pile Foundations**	IBC provisions more extension, updated
A.1 General.	1. Definitions 2. Piers and Piles – General Requirements 2.1 Design 2.2 General 2.3 Special types of piles	IBC provisions more extensive, definitions new to model code
A.2 Interconnection	2.4 Pile caps	Similar
A.3 Determination of Allowable Loads A.4 Static Load Tests.	2.8 Allowable pier or pile loads - driving criteria - load tests - load test evaluation - allowable frictional resistance - uplift capacity - load bearing capacity - bent piers or piles - overloads on piers or piles	IBC provisions more extensive, updated
A.5 Column Action.	2.9 Lateral support	Similar
A.6 Group Action.	1808.2.2; item 9.	Similar
A.7 Piles in Subsiding Areas.	2.11 Piles in subsiding areas	Similar
A.8 Jetting.	2.13 Pre-excavation	Similar
A.9 Protection of Pile Materials.	2.17 Protection of pile materials	Similar
A.10 Allowable Loads.	2.8 Allowable pier or pile loads	Similar

2001 CBC – Chapter 18A	IBC – Chapter 18	Comments
	also see 1808.2.8.4 (allowable frictional resistance)	
A.11 Use of Higher Allowable Pile Stresses.	2.10 Use of higher allowable pier or pile stresses	Similar
-	1808.2: 2.5 Stability 2.6 Structural integrity 2.7 Splices 2.12 Settlement analysis 2.14 Installation sequence 2.15 Use of vibratory drivers 2.16 Pile drivability 2.18 Use of existing piers or piles 2.19 Heaved piles 2.20 Identification 2.21 Pier or pile location plan 2.22 Special inspection 2.23 Seismic design of piers or piles (based on SDC, whether C, or D, E, F)	IBC contains new provisions, evaluate and adopt
1808A - Specific Pile Requirements	**1809 - Driven Pile Foundations**	IBC provisions more extension, updated
A.1 Round Wood Piles. 1.1 Material 1.2 Allowable stresses	1809.1 Timber piles 1.1 Materials 1.2 Preservative treatment 1.3 End-supported piles	Similar, IBC provisions updated, reference AF & PA NDS for design, ASTM D 25 and DOC PS-20 for material, and AWPA C3 for treatment
A.2 Uncased C-I-P Concrete Piles 2.1 Material 2.2 Allowable stresses	**1810 - Cast-in-Place Concrete Pile Foundations** 1810.1 General 1. Materials 2. Reinforcement (SDC-based provisions included) 3. Concrete placement 1810.2 Enlarged base piles 1. Materials 2. Allowable stresses 3. Installation 4. Load-bearing capacity 5. Concrete cover 1810.3 Drilled or augered uncased piles 1. Allowable stresses 2. Dimensions 3. Installation 4. Reinforcement 5. Reinforcement in SDC C, D, E or F	IBC provisions more extensive

2001 CBC – Chapter 18A	IBC – Chapter 18	Comments
A.3 Metal-cased Concrete Piles (both CIP and driven) 3.1 Material 3.2 Installation 3.3 Allowable stresses	1810.4 Driven uncased piles 1. Allowable stresses 2. Dimensions 3. Installation 4. Concrete cover 1810.5 Steel-cased piles 1. Materials 2. Allowable stresses 3. Installation 4. Reinforcement 1810.7 Caisson piles 1. Construction 2. Materials 3. Design 4. Structural core 5. Allowable stresses 6. Installation	Similar
A.4 Pre-cast Concrete Piles 4.1 Materials 4.2 Reinforcement ties 4.3 Allowable stresses	1809.2 Precast concrete piles 1. General 1.1 Design and manufacture 1.2 Minimum dimension 1.3 Reinforcement 2. Precast nonprestressed piles 2.1 Materials 2.2 Minimum reinforcement (SDC-based) 2.3 Allowable stresses 2.4 Installation 2.5 Concrete cover	IBC provisions more comprehensive, updated
A.5 Precast Prestressed Concrete Piles (Pretensioned) 5.1 Materials 5.2 Reinforcement 5.3 Allowable stresses	1809.2.3 Precast prestressed piles 1. Materials 2. Design (SDC-based) 3. Allowable stresses 4. Installation 5. Cover	IBC provisions more comprehensive, updated
A.6 Structural Steel Piles 6.1 Material 6.2 Allowable stresses 6.3 Minimum dimensions	1809.3 Structural steel piles 1. Materials 2. Allowable stresses 3. Dimensions of H-piles 4. Dimensions of steel pipe piles	Similar
A.7 Concrete-filled Steel Pipe Piles 7.1 Material 7.2 Allowable stresses 7.3 Minimum dimensions	1810.6 Concrete-filled steel pipe and tube piles 6.1 Materials 6.2 Allowable stresses 6.3 Minimum dimensions	Similar; IBC provisions updated

2001 CBC – Chapter 18A	IBC – Chapter 18	Comments
	6.4 Reinforcement 6.5 Placing concrete	
-	**1811 - Composite Piles** 1. General 2. Design 3. Limitation of load 4. Splices 5. Seismic reinforcement	New provisions - evaluate for adoption
1806A.8 provisions are related (see above)	**1812 - Pier Foundations** 1. General 2. Lateral dimensions and height 3. Materials 4. Reinforcement 5. Concrete placement 6. Belled bottoms 7. Masonry 8. Concrete 9. Steel shell 10. Dewatering	IBC 1812 provisions are new (primarily prescriptive construction requirements); evaluate for adoption and amendment
1809A - Foundation Construction - Seismic Zones 3 and 4 A.1 General.	1805.4.2.2 Footing seismic ties 1805.5.5 Seismic requirements (prescriptive foundation walls) 1805.9 Seismic requirements (foundations for SDC D, E, F)	IBC incorporates SDC-based seismic design provisions within each section
A.2 Soil Capacity.	1802.2.7 Seismic design category D, E, or F. (soils investigation)	Similar
A.3 Superstructure-to-Foundation Connection.	1805.9 references ACI 318-02, Section 21.8	Similar
A.4 Foundation-Soil Interface.	1801.2.1 Foundation design for seismic overturning	Similar
A.5 Special Requirements for Piles and Caissons - OSHPD amends for Sd, Se, Sf soils	1808.2.23 Seismic design of piers or piles 1809.2.2.2 Minimum reinforcement (pre-cast driven piles; SDC-based requirements) 1809.2.3 Pre-cast prestressed piles; see 1809.2.3.2.1 (SDC C), 1809.2.3.2.2 (SDC D, E, F) 1810.1.2 Reinforcement (CIP concrete pile); see 1810.1.2.1 for SDC C, 1810.1.2.2 for SDC D, E, F 1810.3.5 Reinforcement in SDC C, D, E, F (drilled or augered uncased piles) 1810.5.4.1 Seismic reinforcement (steel-cased piles) 1810.6.4.1 Seismic reinforcement	IBC contains more extensive requirements; evaluate for discontinuation of OSHPD amendments in CBC

2001 CBC – Chapter 18A	IBC – Chapter 18	Comments
	(concrete-filled steel pipe and tube piles) 1811.5 Seismic reinforcement (composite piles)	
A.6 Inspection of Piles (OSHPD amendment)	1808.2.22 Special Inspection	Continue OSHPD amendment
A.7 Inspection of Caissons (OSHPD amendment)	1808.2.22 Special Inspection	Continue OSHPD amendment
Table 18A-I-A Allowable Foundation and Lateral Pressure	**Table 1804.2** Allowable Foundation and Lateral Pressure	Similar
Table18A-I-B Classification of Expansive Soil	-	No effect to OSHPD program
Table 18A-I-C Foundations for Stud Bearing Walls - Minimum Requirements	**Table 1805.4.2** Footings Supporting Walls of light-Frame Construction	Similar
Figure 18A-I-1 Setback Dimensions	**Figure 1805.3.1** Foundation Clearances from Slopes	Similar
-	**Table 1805.5(1)** Plain Masonry and Plain Concrete Foundation Walls	Do not adopt prescriptive design provisions
-	**Table 1805.5(2)** 8-Inch Concrete and Masonry Foundation Walls with Reinforcing Where d > 5 inches	Do not adopt prescriptive design provisions
-	**Table 1805.5(3)** 10-Inch Concrete and Masonry Foundation Walls with Reinforcing Where d > 6.75 Inches	Do not adopt prescriptive design provisions
-	**Table 1805.5(4)** 12-Inch Concrete and Masonry Foundation Walls with Reinforcing Where d > 8.75 Inches	Do not adopt prescriptive design provisions

Chapter 18A - Foundations and Retaining Walls

2001 CBC – Chapter 18A	NFPA5000 – Chapter 36	Comments
Division I - General **1801A – Scope** References App. Chapter 33A, UBC Std. 18-1 (soils classification), UBC Std. 18-2 (expansion index test)	[Note - Chapter 36 is titled "Soils, Foundations, and Retaining Walls"] **36.1 Scope**	Similar
1802A - Quality and Design Refers to App. Ch. 33	-	No effect noted
3301 - Excavations and Fills 1.1 General 1.2 Protection of adjoining property *1.3 Protection of existing buildings* (OSHPD amendment, continue in 2004 CBC)	**36.2 Excavations** 1. Scope 2. Protection of Excavations 3. Permanent Excavations 4. Fill 5. Site preparation	Similar scope; continue OSHPD amendments Evaluate 36.2.3.3 regarding phrase "safe side slopes, as determined by the AHJ", may need to repeal or establish specific requirements (consult CDMG) Review 36.2.4.3.2 for non-adoption (note also does not prescribe a standard for compaction) Evaluate
1803A - Soil Classification - Expansive Soil	**36.3.3 Expansive Soils**	Similar
1804A - Foundation Investigation A.1 General. OSHPD amends re: required geotechnical investigation A.2 Investigation. OSHPD amends re: minimum # of borings, liquefaction analysis A.3 Reports. OSHPD amends re: liquefaction, high sulfate soils A.4 Expansive Soils. A.5 Liquefaction Potential. A.6 Adjacent Loads. A.7 Drainage.	**36.3 Investigation and Bearing Capacity of Soil** 1. Classification 2. Soil investigation 3. Expansive soils 4. Presumptive capacities Site drainage - see 36.8.5 Site Grading	Continue OSHPD amendments 36.3.2.1 and 36.3.2.2 require evaluation prior to adoption No provisions to assess seismic effects (loading on retaining or basement walls, liquefaction, differential settlement, etc.) For SDC C, D, E, F, ASCE 7-02 Sec. 9.7.4.1 requires investigation to address slope instability, liquefaction, spreading and surface rupture.
1805A - Allowable Foundation and Lateral Pressures Requires report based on bldg. Size, type of const. and loads	**36.3.4 Presumptive Capacities** Refers to Table 36.3.4(a) (allowable vertical load) and Table 36.3.4(b) (allowable lateral load)	Table 36.3.4(a) and (b) terms for "Class of Material" Terms "soft", "medium", "hard", "compact", "loose" may be problematic for interpretation and use by typical users (non-geotechnical engineer) of these tables - evaluate and consult with CDMG to determine whether or not OSHPD can adopt, and if amendment is needed Evaluate footnote (a) of Table 36.3.4(a) regarding "unusual soil or moisture conditions" to determine if amendment or interpretation is needed
1806A - Footings A.1 General. OSHPD amends re: unformed footing size	**36.4 Soil-Bearing Footings** 36.4.1 General Provisions 36.4.1.2. (excavations)	Continue OSHPD amendment in 36.4.1.2, amend 36.4.1.2.2 to indicate 12" <u>minimum</u>
A.2 Footing Design. OSHPD amends re: elastic analysis. Model code provision refers to Div. III for slab/mat structure on expansive soils	36.4.1.4 (slab, raft, mat foundations on expansive soils)	Continue OSHPD amendment in 36.4.1.1
A.3 Bearing Walls. OSHPD amends to require shear wall footing to meet bearing wall footing	-	Continue model code provision and amendment

2001 CBC – Chapter 18A	NFPA5000 – Chapter 36	Comments
requirements.		
A.4 Stepped Foundations. OSHPD amends to limit step dimensions, detailing.	36.4.1.3	NFPA does not allow 10% slope at bottom. Continue OSHPD amendment provisions
A.5 Footings on or Adjacent to Slopes. 1. scope 2. clearance from ascending slope 3. setback from descending slope 4. pools (setback from pool wall) 5. foundation elevation (drainage) 6. alternate setback and clearance	-	Develop amendments to continue CBC (model code) provisions
A.6 Foundation Plates or Sills. 1. DSA amend. 2. sills at bearing and shear walls, OSHPD amends to ref. 2320A.6 3. Additional requirements for Seismic Zones 3 and 4 - 2x2x 3/16 plate washers	36.6.3 Foundation Plate or sill bolting (makes general reference to Chapter 45; no specific provisions found in Chapter 45)	NFPA 5000 nor referenced standard (NDS) prescribe any minimum sill bolting requirements. Only addressed for 1 and 2 family dwellings if designed per AF&PA WFCM, but WFCM does not prescribe plate washer requirements. AF& PA Wind/Seismic Supplement prescribes minimum bolting for shear walls, and does prescribe plate washer requirements for designed shear walls. Develop amendments to maintain current provisions.
A.7 Seismic Zone 3 and 4. Requires #4 cont. top and bottom at foundation.	-	Continue CBC provisions as amendment in 2004 CBC
A.8 Designs Employing Lateral Bearing. 1. general (OSHPD amends re: pile and caisson elastic deformation) 2. design criteria; non-constrained and constrained 3. backfill 4. limitations	36.4.2 Design Using Lateral Bearing 36.4.3 Design Formula - No Constraint 36.4.4 Design Formula - Constrained	Similar; continue OSHPD amendment in CBC item 1.
-	36.4.5 Flood Hazard Areas	Evaluate prior to adoption, consult DWR
A.9 Gillage Footings.	-	Evaluate to determine if amendment needed
A.10 Bleacher Footings	-	Evaluate to determine if amendment needed (also see Chapter 35 provisions regarding bleachers)
A.11 Pipes and Trenches (OSHPD amendment re: trench setback, sleeved pipes)	-	Continue OSHPD amendments
1807A - Piles - General Requirements A.1 General. A.2 Interconnection A.3 Determination of Allowable Loads A.4 Static Load Tests. A.5 Column Action.	**36.5 Pile Foundations** 1. Conditions of use 2. Axial and lateral loads for piles 3. Driven piles 4. Wood piles 5. Precast concrete piles 6. Prestressed precast concrete piles	Amend 36.5.2 to prescribe geotechnical investigation/report requirements per CBC Evaluate 36.5.1.6 (interconnection of piles of min. 5% of pile load; CBC 1807A.2 is 10%, so min. design tie load is 1/2 of current requirement) Note: 36.1.1 specifies conformance with ASCE 7-02, Sec. 9.7.4.3 of ASCE 7-02 specifies 10% as minimum design load for SDC C or greater. NFPA 5000 Sec. 1.3.2 (precedence) states that NFPA 5000 provision would govern in case of conflict.

2001 CBC – Chapter 18A	NFPA5000 – Chapter 36	Comments
A.6 Group Action. A.7 Piles in Subsiding Areas. A.8 Jetting. A.9 Protection of Pile Materials. A.10 Allowable Loads. A.11 Use of Higher Allowable Pile Stresses.	7. Structural steel shapes 8. Cast-in-place concrete piles	Evaluate continuation of CBC 1807A Sec. A.7, A.9, A.11 as amendments to 2004 CBC Evaluate 36.5.2.1 (dynamic load test) for adoption
1808A - Specific Pile Requirements A.1 Round Wood Piles. A.2 Uncased C-I-P Concrete Piles A.3 Metal-cased Concrete Piles A.4 Pre-cast Concrete Piles A.5 Precast Prestressed Concrete Piles (Pretensioned) A.6 Structural Steel Piles A.7 Concrete-filled Steel Pipe Piles	36.5.3 Driven piles 36.5.4 Wood piles 36.5.5 Precast concrete piles 36.5.6 Prestressed precast concrete piles 36.5.7 Structural steel shapes 36.5.8 Cast-in-place concrete piles	Evaluate 36.5.3.1 - verify that plans and specifications are required per code to denote resistance/penetration requirements; should state "approved" plans CIP concrete pile provisions more comprehensive than CBC Structural steel pile requirements less than CBC - evaluate
-	**36.6 Foundation Walls** 1. General requirements - isolated piers - isolated piers substituted for interior foundation walls - flood hazard areas 2. Foundation wall thickness - minimum thickness for concrete and masonry walls - foundation walls not meeting parameters of Tables 36.6.2.2(a) through (d) - thickness based on walls supported - thickness based on soils loads, unbalanced backfill height, and wall height - rubble stone - foundation walls - alternative concrete or masonry foundation wall reinforcement 36.6.3 Foundation Plate or sill bolting 36.6.4 Masonry pier and curtain wall foundations	Do not adopt prescriptive provisions for foundation walls (36.6.1, 36.6.2, 36.6.4) Amend 36.6.3 (see comments above)
-	**36.7 Wood Foundation Systems**	Do not adopt Sec. 36.7
-	**36.8 Waterproofing and Dampproofing** 1. Waterproofing required 2. Dampproofing required	New provisions to model code - evaluate for adoption (except 36.8.5, site grading, is similar to CBC provisions regarding site drainage

2001 CBC – Chapter 18A	NFPA5000 – Chapter 36	Comments
	3. Foundation drain 4. Floor base 5. Site grading	
1611A.6 Retaining Walls	**36.9 Retaining Walls** 1. Design 2. Hydrostatic pressure 3. Concrete retaining walls 4. Reinforced masonry retaining walls 5. Segmental retaining walls (ref. NCMA *Design Manual for Segmented Retaining walls*	Continue amendments of 1611A.6 in 36.9 36.9.1 does not prescribe FOS for overturning, sliding, soil pressure, and uplift (amend to maintain current CBC requirements)
1809A - Foundation Construction - Seismic Zones 3 and 4 A.1 General. A.2 Soil Capacity. A.3 Superstructure-to-Foundation Connection. A.4 Foundation-Soil Interface. A.5 Special Requirements for Piles and Caissons - OSHPD amends for Sd, Se, Sf soils A.6 Inspection of Piles (OSHPD amendment) A.7 Inspection of Caissons (OSHPD amendment)	36.1.1 (refers to ASCE 7-02, Section 9 and A9.7 for SDC C, D, E, F locations) 36.6 (foundation wall) provisions reference ASCE 7 limitations (general reference)	Evaluate ASCE 7-02 provisions for any needed amendments Continue A.6, A.7 amendments
Table 18A-I-A Allowable Foundation and Lateral Pressure	**Table 36.3.4(a)** Maximum Allowable Soil Pressures **Table 36.3.4 (b)** Maximum Allowable Lateral Soil Pressures	Table 36.3.4(a) and (b) terms for "Class of Material" Terms "soft", "medium", "hard", "compact", "loose" may be problematic for interpretation and use by typical users (non-geotechnical engineer) of these tables - evaluate and consult with CDMG to determine whether or not OSHPD can adopt, and if amendment is needed Evaluate footnote (a) of Table 36.3.4(a) and (b) regarding "unusual soil or moisture conditions" to determine if amendment or interpretation is needed Table 36.3.4(b) does not contain lateral sliding coefficients and resistance data
Table18A-I-B Classification of Expansive Soil	-	No effect to OSHPD program
Table 18A-I-C Foundations for Stud Bearing Walls - Minimum Requirements	-	Evaluate for amendment; prescriptive requirements used for light-frame structures
Figure 18A-I-1 Setback Dimensions	-	Develop amendments to continue CBC provisions
-	**Table 36.6.2.2(a)** Plain Masonry and Plain Concrete Foundation Walls	Do not adopt

2001 CBC – Chapter 18A	NFPA5000 – Chapter 36	Comments
-	**Table 36.6.2.2(b)** 8-Inch Reinforced Concrete and Masonry Foundation Walls Where d is Greater Than or Equal to 5 Inches-Reinforced Masonry	Do not adopt
-	**Table 36.6.2.2(c)** 10-Inch Reinforced Concrete and Masonry Foundation Walls Where d is Greater Than or Equal to 6.75 Inches-Reinforced Masonry	Do not adopt
-	**Table 36.6.2.2(d)** 12-Inch Reinforced Concrete and Masonry Foundation Walls Where d is Greater Than or Equal to 8.75 Inches-Reinforced Masonry	Do not adopt